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Gudrun E. Huckett
Gudrun E. Huckett, Patent Agent

Applicant: Alfred Trzmiel et al.
Serial No: 10/057,292
U.S. Filed: 1/25/2002
For: Control Device for Hydraulic and/or Mechanical Components
Examiner: Frank D. Lopez
Art Unit: 3745

Commissioner for Patents
Alexandria, VA 22313-1450

INFORMATION DISCLOSURE STATEMENT

In accordance with 37 CFR § 1.56, Applicant wishes to call the attention of the Examiner to the reference(s) cited on the attached form PTO-1449.

The reference has been cited in the counterpart European patent application. A copy of the listed document is attached.

This reference provides a general overview of piezo actuators in the field of hydraulics. On page 354, the problems in regard to employing piezo ceramic materials as valve control elements are discussed. The most important problem in this connection is the rather limited stroke that can be performed by such piezo ceramic materials. In order to create the desired stroke length of appr. 200 μm , it would be necessary to have a great stack height. This is prohibitive with respect to costs and size of the resulting device.

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1/21/04: IDS for Ser. No. 10/057,292 filed 1/25/2002 - Inventor(s): Trzmiel et al.

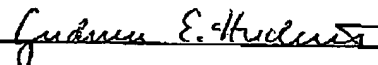
Therefore, a general concept resides in enlarging the available stroke by hydraulic or mechanical means.

The hydraulic approach is to provide a large surface area of the piezo material acting on a hydraulic medium that, in turn, acts on a small surface area of the actuator piston. These designs have problems with leakage or, in the case of a sealed system, thermal expansion and stability. A mechanical stroke increase can be realized in that lever or linkage systems are used (example is shown in Fig. 4 of p. 354). This mechanical concept is also employed in U.S. 5,821,671 (submitted electronically on 1/16/2004). U.S. 5,821,671 was also cited in the counterpart European application.

It is respectfully requested that any fees required and not enclosed herewith or any shortages in any fees be charged to Deposit Account 50-1199.

Consideration of the foregoing in relation to this application is respectfully requested.

Respectfully submitted January 21, 2004,



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Enclosures:

- ☒ PTO 1449
- ☒ reference(s)
- ☐ search report (incl. translation)
- ☐ fee

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1/21/04: IDS for Ser. No. 10/057,292 filed 1/25/2002 - Inventor(s): Trzmiel et al.